

East Cheyenne Gas Storage, LLC Aerial Methane Leak Survey

**East Cheyenne Gas Storage
34511 County Road 39
Peetz, CO 80747**

Prepared For:

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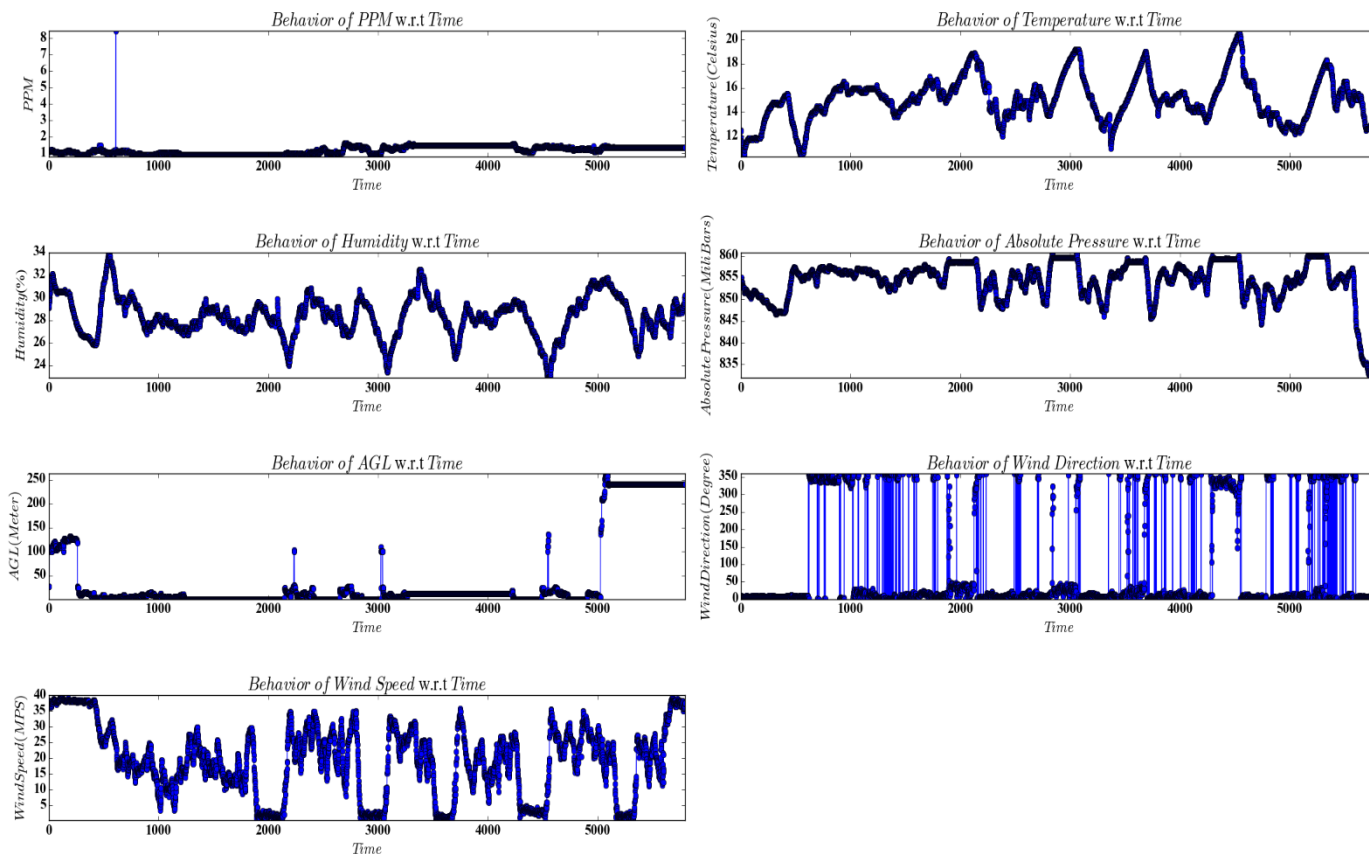


Mr. Preisler,

This report contains the results of the helicopter-based pipeline and well pads integrity survey that was conducted on 03/09/2016 by Red Hen Systems, LLC and Ridgeline Aviation, Inc. on behalf of East Cheyenne Gas Storage, LLC. After thorough examination and analysis of the recorded video and data log files, it was determined that methane concentration points measured in the pipeline rights-of-way and within the area of interest belonged to Class 3 (green) level, of which were below or at the ambient levels known for the area of interest, and representing that none of the readings were classified as anomalous. There were 3 yellow grid blocks in the NE4 of section 36 that indicated concentrations at ~1.6 PPM. There was one event of high methane concentration classified as Class 1 (Red-Colored Point of Interest) located outside the area of interest. For this event the highest parts-per-million (PPM) value recorded was at 8.43 and was located near "Trailblazer Interconnect" at Lat: 40°59'22.91"N Long: 103°12'37.24"W.

The survey associated information is provided in .kml format. The helicopter path information, as well as, all of the associated raw metadata that was recorded are shown in the "Peetz_Survey_Helicopter_Route.kmz" file where points are illustrated by directed arrows representing the heading of the helicopter at that time of the helicopter path (all of the points are active and can be clicked on). The processed concentration (PPM) points are shown in the "Peetz_Survey_Classification_Part1.kml" and "Peetz_Survey_Classification_Part2" files where all of the points are visualized in green, yellow or red-colored bubbles representing their relationship to the ambient level and are also active. The grid representation of the classified points is shown in "Peetz_Survey_POLYGON_METADATA.kml" where each grid is active and provides average values for each of the readings based on the selected grid. Also, the recorded metadata is provided in spreadsheet CSV file named "Peetz_Survey_CSV.csv"

In addition to classification files and data logs, behavior of the attributes such as AGL, Humidity, PPM Distribution, Wind Speed, Pressure, Speed over Ground and Temperature are illustrated in the plot below:

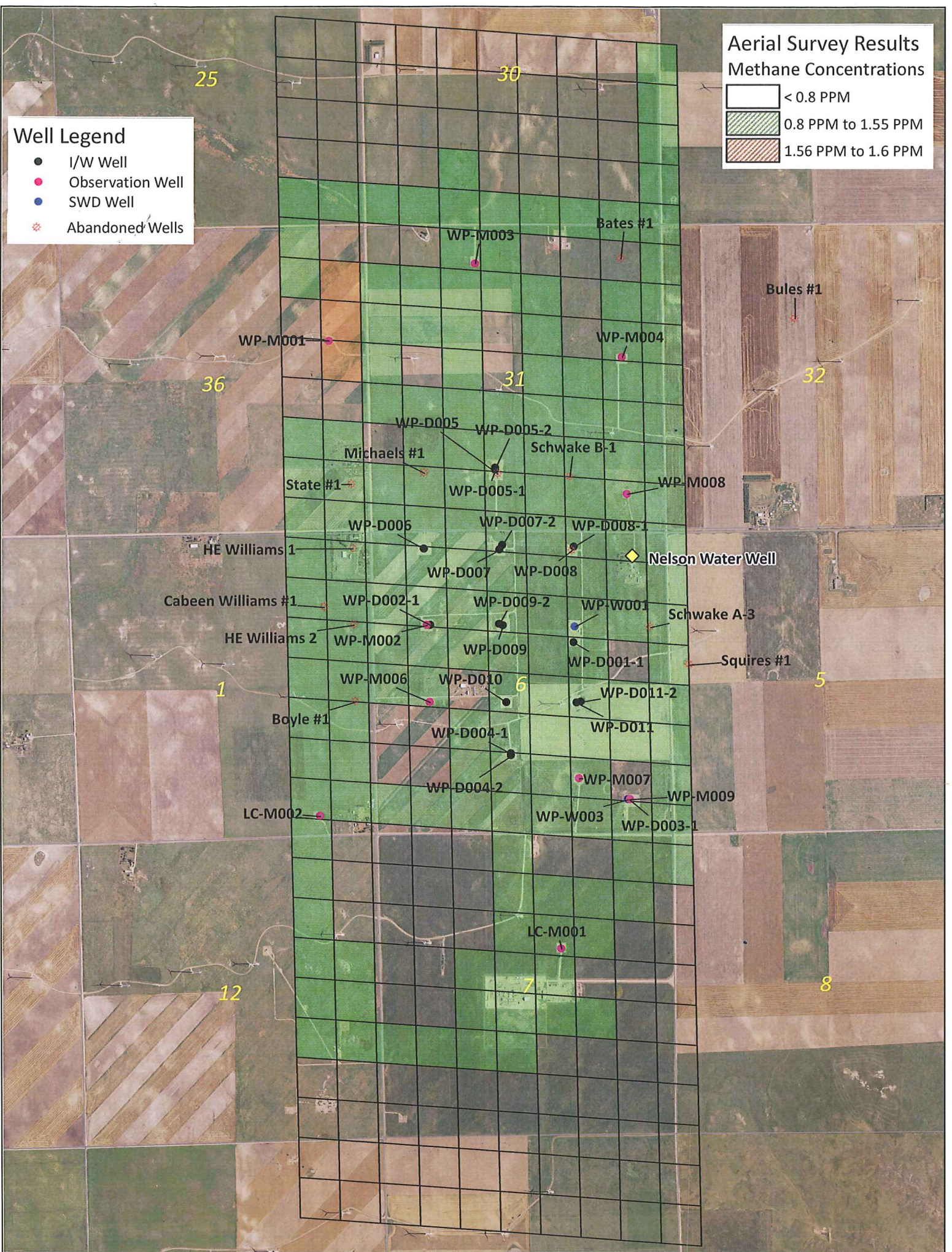


Statistics for the entire survey:

Methane Concentration (PPM)	Mean: 1.1941	STD: 0.2464	Median: 1.2	Maximum: 8.4333
Speed Over Ground (KPH)	Mean: 33.6747	STD: 21.6813	Median : 34.5	Maximum: 88.1
Temperature (Celsius)	Mean: 15.0773	STD: 1.8437	Median: 15.0	Maximum: 20.7
Humidity (%)	Mean: 28.3742	STD: 1.7519	Median: 28.4	Maximum : 34.0
Pressure (Millibars)	Mean: 854.2682	STD: 4.8404	Median: 855.37	Maximum: 860.77
AGL (Meter)	Mean: 43.2575	STD: 80.3095	Median: 10.0	Maximum: 262.0
WindSpeed (MPS)	Mean: 19.4280	STD: 11.1197	Median: 20.12	Maximum: 40.03

Supplemental Information (electronic form only):

Peetz_Survey_Helicopter_Route
Peetz_Survey_Infrastructure
Peetz_Survey_Classification_Part1
Peetz_Survey_Classification_Part2
Peetz_Survey_POLYGON_METADATA
Peetz_Survey_CSV
Concentration_w.r.t._Others_Variations
Rolling_Window_Data_Variations



East Cheyenne Gas Storage, LLC
Well List – Methane Survey

API No.	Well Name	FERC ID	Status	T/R/S
<u>Injection / Withdrawal Wells</u>				
05-075-09405	ECGS #6-17 WPD001-1	WP-D001-1	Active	11N 52W SWNE 6
05-075-09401	ECGS #6-15 WPD002-1	WP-D002-1	Active	11N 52W SWNW 6
05-075-09409	ECGS #6-19 WPD003-1	WP-D003-1	Active	11N 52W SESE 6
05-075-09389	ECGS #6-12	WP-D004-1	Active	11N 52W NESW 6
05-075-09426	ECGS #6-21 WPD004-2	WP-D004-2	Active	11N 52W NESW 6
05-075-09410	ECGS #31-7 WPD005-1	WP-D005-1	Active	12N 52W SESW 31
05-075-09427	ECGS #31-10 WPD005-2	WP-D005-2	Active	12N 52W SESW 31
05-075-07182	Gillham 6	WP-D006	Active	11N 52W NWNW 6
05-075-07180	Gillham 2	WP-D007	Active	11N 52W NENW 6
05-075-09411	ECGS #6-13 WPD007-2	WP-D007-2	Active	11N 52W Lot 3 6
05-075-09403	ECGS #6-14 WPD008-1	WP-D008-1	Active	11N 52W NWNE 6
05-075-07169	Gillham 1	WP-D009-1	Active	11N 52W SENW 6
05-075-09402	ECGS #6-16 WPD009-2	WP-D009-2	Active	11N 52W SENW 6
05-075-07156	Gillham 3	WP-D010	Active	11N 52W NESW 6
05-075-07146	Dorothy Strange 1	WP-D011-1	Active	11N 52W NWSE 6
05-075-09406	ECGS #6-18 WPD011-2	WP-D011-2	Active	11N 52W NWSE 6
<u>Storage Observation Wells</u>				
05-075-08197	State 1-36L	WP-M001	Active	12N 53W SENE 36
05-075-07166	Gillham 4	WP-M002	Active	11N 52W SWNW 6
05-075-08737	Lentfer-Michaels 1	WP-M003	Active	12N 52W NENW 31
05-075-09400	ECGS #31-9 WPM004	WP-M004	Active	12N 52W SENE 31
05-075-07155	Gillham 5	WP-M006	Active	11N 52W NWSW 6
05-075-07158	D Strange 1	WP-M007	Active	11N 52W SWSE 6
05-075-08799	Schwake 1	WP-M008	Active	12N 52W SESE 31
05-075-09408	ECGS #5-2 WPD003-2	WP-M009	Active	11N 52W SESE 6
05-075-07127	Narjes 3	LC-M001	Active	11N 52W SWNE 7
05-075-07140	Boyle 2	LC-M002	Active	11N 53W SESE 1
<u>Produced Water Disposal Wells</u>				
05-075-07167	Schwake A-1	WP-W001	Active	11N 52W SWNE 6
05-075-09407	ECGS #6-20J WPW003	WP-W003	Active	11N 52W SESE 6
<u>Plugged and Abandoned Wells</u>				
05-075-07200	Michaels 1 (SESW)	WP-D005	PA	12N 52W SESW 31
05-075-07199	Michaels 1 (SWSW)	NA	PA	12N 52W SWSW 31
05-075-07198	Schwake B-1	NA	PA	12N 52W SWSE 31
05-075-08222	Bates 1	NA	DA	12N 52W NENE 31
05-075-07222	Bules 1	NA	DA	12N 52W SENW 32
05-075-07195	State 1	NA	PA	12N 53W SESE 36
05-075-07160	Squires 1	NA	DA	11N 52W SWNW 5
05-075-07181	Schwake A-2	WP-D008	PA	11N 52W NWNE 6

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API No.	Well Name	FERC ID	Status	T/R/S
05-075-07168	Schwake A-3	WP-M005	PA	11N 52W SENE 6
05-075-07171	Cabeen Williams 1	NA	PA	11N 53W NENE 1
05-075-07183	HE Williams 1	NA	PA	11N 53W NENE 1
05-075-07170	HE Williams 2	NA	PA	11N 53W SENE 1
05-075-07157	Boyle 1	NA	DA	11N 53W NESE 1